

# 10: Sampling Distributions with StatKey

Stat 120 | Fall 2025

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No R needed today! We'll focus on concepts and intuition with StatKey

1. Use StatKey's **mean** menu: [https://www.lock5stat.com/StatKey/sampling\\_1\\_quant/sampling\\_1\\_quant.html](https://www.lock5stat.com/StatKey/sampling_1_quant/sampling_1_quant.html) and select "Percent with internet access 3e (countries)". Click "Show data table".

- (a) What is each case?
- (b) What is each variable?
- (c) Do you think this dataset represents a population or a sample?
- (d) Close the dataset viewer. Click "Generate 10 samples". What does each dot represent?
- (e) What happens to the shape, center, and spread of the sampling distribution as  $n$  increases? (You can use "Generate 1000 samples" to speed this up)
- (f) Is there a number of samples where the distribution doesn't change much?

2. Use StatKey's **proportion** menu: [https://www.lock5stat.com/StatKey/sampling\\_1\\_cat/sampling\\_1\\_cat.html](https://www.lock5stat.com/StatKey/sampling_1_cat/sampling_1_cat.html) to answer the following. (a) Click the "edit proportion" button to change the population parameter  $p$

- (a) Choose a value of  $p$  that is between .2 and .8. Describe how the shape, center, and spread of the sampling distribution changes as  $n$  increases
- (b) Describe how the shape, center, and spread of the sampling distribution changes as  $p$  gets closer to 1

3. About 10% of the worldwide population is left-handed. A 200-seat lecture hall has been built with 15 rows (the number of seats in each row varies). Each row has a single "lefty seat" that has the built-in desk on the left rather than the right arm of the chair. In a class of 90 students, what's the probability that there will not be enough seats for the left-handed students?

- (a) What number of left-handed students would have to be in the class for there to not be enough desks?
- (b) Set up the sampling distribution using StatKey. What is  $p$  and  $n$ ?
- (c) Simulate 1000 samples. Use the results to estimate the probability.

- (d) Now suppose there's a class of 50 instead. Do you think this probability will be higher, lower, or about the same as (d)?
- (e) Use StatKey to estimate the probability in (d). Are you surprised?

4. Explain the difference between (1) the distribution of a population, (2) the distribution of a sample, (3) the sampling distribution. Be sure to fill in these definitions in your note sheet.

When you're done, submit the answers to number 3 on gradescope. You only need to submit 1 per group.